Applications of edge computing in mining

The mining and metals industries are embracing digital technologies to solve challenges such as managing miner safety while ensuring production efficiency, reducing the environmental impact of mining activities and increasing profitability.

Ensuring miner safety is of utmost importance to industry stakeholders, and organisations have been building solutions to reduce risks such as:

- rockfalls/fall of sides while working in mines
- difficulty in identifying escape routes in emergencies
- unsafe site conditions due to lack of proper inspection
- hazardous environment due to toxic gas leakages or high temperatures

The challenges faced by the workforce need to be solved quickly because any delay during emergency situations can lead to loss of lives at the worksite. Moreover, mines are often located in remote areas where no proper communication infrastructure is available. **Edge computing** can be used to address these pain points as it can be utilised in areas that do not have proper cell towers.

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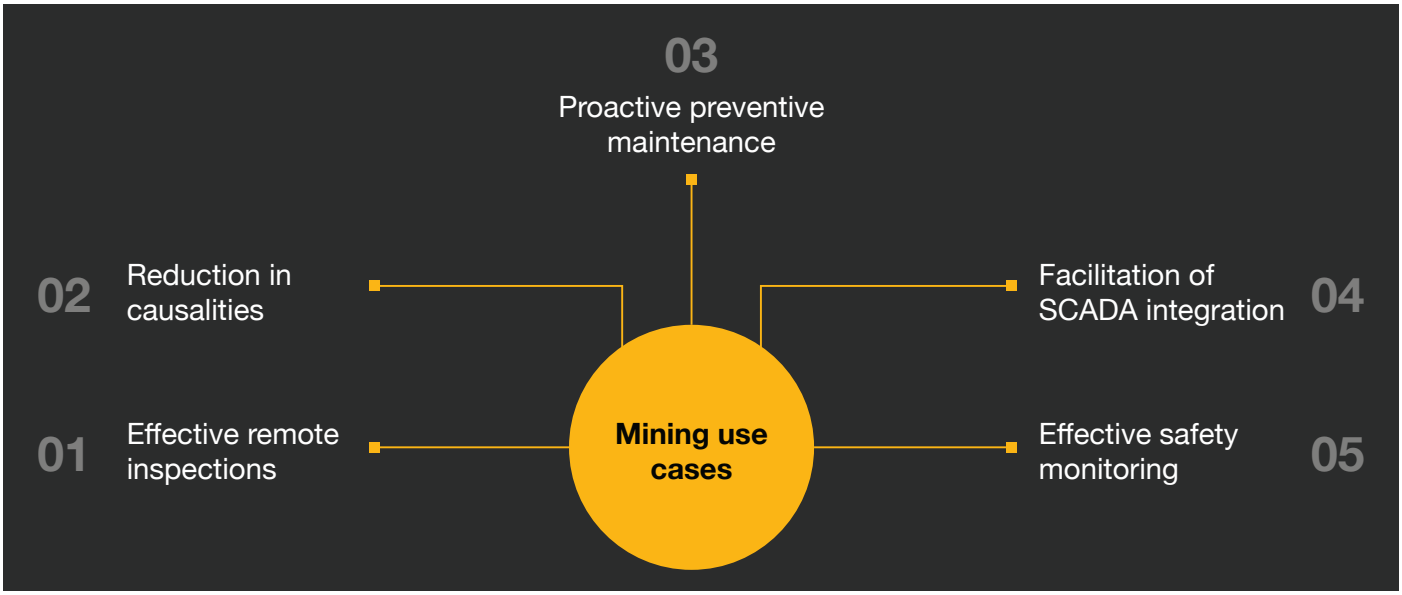
Let's take a closer look at the applications of edge computing in the mining industry:



1. Effective remote inspections:

Officials and government representatives carry out periodic safety inspections of mines. These personnel are required to travel physically to the inspection locations. Remote inspection by officials can help in regular proactive monitoring and inspection of mining sites. Edge computing can simplify this process and reduce the frequency of manual inspections.

The sensors on the on-site mining equipment generate data. However, sending this data to officials at remote locations who interpret the same and issue relevant warnings to mining sites takes time. Hence, real-time processing of data is important in order to warn the workforce of any abnormalities observed during remote inspection. Using edge computing, data generated by sensors on employees and monitoring equipment inside the mines can be transmitted and processed in real time and with minimum latency. Also during physical inspections, reports on the data generated by edge points in the mines can help officials carry out their inspections more efficiently.

2. Reduction in the number of casualties:

Currently, rescue and emergency services follow emergency action plans in a reactive manner only when accidents occur. Any delay in the manual response during these situations can lead to permanent disability or loss of life. These situations can be reduced by adopting edge computing. The rescue and emergency response team can survey the mine through various sensors and cameras at the site and warn miners immediately if any abnormal conditions are detected.

3. Proactive preventive maintenance:

In mining sites, replacements and repairs are carried out on illumination, noise and drilling equipment only after their defunct condition is reported reactively, which leads to disruption in work. This delay or disruption can be avoided if edge computing technology is implemented at these sites. Edge computing can help carry out preventive maintenance by processing and analysing the data obtained through sensors attached to the equipment. Moreover, this data can also help in taking decisions on proactive maintenance.

4. Facilitation of supervisory control and data acquisition (SCADA) integration:

In the mining industry, SCADA software and hardware collect and analyse real-time data with the help of sensors used for monitoring and controlling the operations of a plant. Edge computing technology can efficiently integrate with SCADA systems, and the data from edge points can be effectively utilised to run artificial intelligence (AI) and machine learning (ML) models and other critical applications in the cloud.

5. Effective safety monitoring:

Real-time data from cameras and illumination, noise, vibration and fire prevention sensors or IoT devices deployed at various locations inside the mines can be analysed in real time with the help of edge computing. This helps in maintaining a healthy environment by measuring toxic gas and SPO2 levels, monitoring traffic patterns, and implementing demand-based routing to prevent congestion and provide automated visual and auditory guidance during normal and emergency situations.

All of the above use cases can be effectively implemented using edge computing technology.

How can we help you?

PwC has a robust structure in place to help you understand the impact of technology on various business areas.

Through our tinkering workshops, we bring together consultants and industry professionals to help you understand this technology and chalk out your organisation's edge computing roadmap.

We can work with you to identify and prioritise edge computing use cases based on their potential for generating business value.

Rapid prototyping

Through our Technology Tinkering Lab, we help you explore potential applications – demonstrations of real-world use cases.

Join us at the Technology Tinkering Lab to co-create impactful solutions for the mining industry.

Read more about edge computing here.

About PwC

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